CLAIMS:

1. A method for delivering media to a plurality of media client having a buffer for caching media of a selected media stream within one stream interval and processing capability for playing the media in a multicast media stream through a network, including the steps of:

- generating plurality of multicast media streams, wherein each multicast media stream is repeated at regular stream intervals;
- joining the media client to a selected multicast media stream in response to a selection request from the media client;
- caching the buffer of the media client continuously with unplayed media in the selected multicast media stream; and
- caching the selected multicast media streams in at least one interactive server,

such that

- interactive requests including any one or more of pause, slow motion, fast forward, rewind, jump forward, and jump backward, and/or errors in playing the media in the media client are handled by the interactive server;
- the media client is split from the selected multimedia media stream when an interactive request is submitted by the media client lasting for an interactive time;
- the media client is merged to the selected multicast media stream after the interactive request is performed by comparing multiples of the stream intervals with the interactive time.

2. The method of Claim 1, wherein the media client is merged to the selected multicast media stream in response to the pause interactive request lasting for a pause time according to the following algorithm:

$$If\ m \times stream\ interval \leq T_{Pause} < (m+1) \times stream\ interval,$$
$$then\ merge\ to\ M(k+m)\ stream$$

where M(k) is the selected multicast media stream, T_{Pause} is the pause time, and m is a positive integer.

3. The method of Claim 1, wherein media client plays the media at a slower speed in response to the slow motion interactive request, and joins the selected multicast media stream after all of the media in the buffer is played.

4. The method of Claim 1, wherein at least one unicast media stream is generated from the interactive server and delivered to the media client in response to a fast forward, rewind, jump forward, or jump backward interactive request from the media client.

5. The method of Claim 4, wherein an interactive unicast media stream is generated from the cached and selected multicast media stream in the interactive server to the client containing media at a requested speed in forward or reverse direction in response to a corresponding fast forward or rewind interactive request from the media client, and containing media starting at the time when the interactive request is generated from the media client.

6. The method of Claim 5 further including the step of generating a merging unicast media stream from the cached and selected multicast media stream in the interactive server to the client containing media starting at the time when the interactive request is terminated, wherein the merging unicast media stream transmits media at a rate higher than the selected multicast media stream, such that the media client merges to the selected multicast media stream after the interactive request is performed.

7. The method of Claim 6, wherein the interactive request is a fast forward interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \leq (P_{MC} - P_{FF}) - (T_{FF} + T_{Fill}) < (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k-m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{FF} is the play-time to begin fast forward operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the fast forward operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

8. The method of Claim 6, wherein the interactive request is a rewind interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \le T_{FF} + T_{Fill} + (P_{REW} - P_{MC})$$
$$< (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k+m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{REW} is the play-time to begin rewind operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the rewind operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

9. The method of Claim 6 further including the step of terminating the interactive unicast media stream at the time when the interactive request is terminated.

10. The method of Claim 4, wherein a merging unicast media stream containing media starting at a requested jumping time is generated from the interactive server and delivered to the media client in response to a jump forward of jump backward interactive request such that the media client merges to the selected multicast media stream after the interactive request is performed.

11. The method of Claim 10, wherein the interactive request is a jump forward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \le (P_{MC} - P_{JF}) - T_{Fill}$$
$$< (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k-m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{JF} is the play-time to begin jump forward operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the jump forward operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

12. The method of Claim 10, wherein the interactive request is a jump forward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \le T_{Fill} + (P_{JB} - P_{MC})$$
$$< (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k+m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{JB} is the play-time to begin jump backward operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the jump backward operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

13. A system for delivering media selection to a plurality of media clients having a buffer for caching media of a selected media stream within one stream interval and processing capability for playing the media in a multicast media stream through a network, including

- at least one media server for generating a plurality of multicast media streams, wherein each multicast media stream is repeated at regular stream intervals, and the media client is joined to a selected multicast media stream in response to a selection request from the media client
- at least one interactive server for caching the selected multicast media stream

such that

- interactive requests including any one or more of pause, slow motion, fast forward, rewind, jump forward, and jump backward, and/or errors in playing the media in the media client are handled by the interactive server;
- the media client is split from the selected multimedia media stream when an interactive request is submitted by the media client lasting for an interactive time;
- the media client is merged to the selected multicast media stream after the interactive request is performed by comparing multiples of the stream intervals with the interactive time.

14. The method of Claim 13, wherein the media client is merged to the selected multicast media stream in response to the pause interactive request lasting for a pause time according to the following algorithm:

$$If\ m \times stream\ interval \leq T_{Pause} < (m+1) \times stream\ interval,$$
$$then\ merge\ to\ M(k+m)\ stream$$

where M(k) is the selected multicast media stream, T_{Pause} is the pause time, and m is a positive integer.

15. The method of Claim 13, wherein media client plays the media at a slower speed in response to the slow motion interactive request, and joins the selected multicast media stream after all of the media in the buffer is played.

16. The method of Claim 13, wherein at least one unicast media stream is generated from the interactive server and delivered to the media client in response to a fast forward, rewind, jump forward, or jump backward interactive request from the media client.

17. The method of Claim 16, wherein an interactive unicast media stream is generated from the cached and selected multicast media stream in the interactive server to the client containing media at a requested speed in forward or reverse direction in response to a corresponding fast forward or rewind interactive request from the media client, and containing media starting at the time when the interactive request is generated from the media client.

18. The method of Claim 17, wherein a merging unicast media stream is generated from the cached and selected multicast media stream in the interactive server to the client containing media starting at the time when the interactive request is terminated, wherein the merging unicast media stream transmits media at a rate higher than the selected multicast media stream, such that the media client merges to the selected multicast media stream after the interactive request is performed.

19. The method of Claim 18, wherein the interactive request is a fast forward interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \le (P_{MC} - P_{FF}) - (T_{FF} + T_{Fill}) < (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k-m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{FF} is the play-time to begin fast forward operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the fast forward operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

20. The method of Claim 18, wherein the interactive request is a rewind interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \le T_{FF} + T_{Fill} + (P_{REW} - P_{MC}) < (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k+m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{REW} is the play-time to begin rewind operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the rewind operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

21. The method of Claim 18 further including the step of terminating the interactive unicast media stream at the time when the interactive request is terminated.

22. The method of Claim 16, wherein a merging unicast media stream containing media starting at a requested jumping time is generated from the interactive server and delivered to the media client in response to a jump forward of jump backward interactive request such that the media client merges to the selected multicast media stream after the interactive request is performed.

23. The method of Claim 22, wherein the interactive request is a jump forward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

$$If\ m \times stream\ interval \le (P_{MC} - P_{JF}) - T_{Fill} < (m+1) \times stream\ interval$$
$$then\ merge\ to\ M(k-m)\ stream$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{JF} is the play-time to begin jump forward operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the jump forward operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.

24. The method of Claim 22, wherein the interactive request is a jump forward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

$$\begin{aligned} &\mathit{If}\ m \times \mathit{stream\ interval} \le T_{Fill} + (P_{JB} - P_{MC}) \\ &< (m+1) \times \mathit{stream\ interval} \\ &\mathit{then\ merge\ to}\ M(k+m)\ \mathit{stream} \end{aligned}$$

where M(k) stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client, P_{JB} is the play-time to begin jump backward operation, P_{MC} is the play-time to resume the normal multicast media stream, T_{FF} is the time for the jump backward operation, T_{Fill} is the time required to fill the buffer by the merging unicast media stream, and m is a positive integer.